



Australian Government

Department of Education, Employment and Workplace Relations

NWP504A Collect and manage hydrometric station survey data

Revision Number: 2

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Modification History

NWP504A Release 2: Layout adjusted. No changes to content.

NWP504A Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to use appropriate survey equipment to collect survey data at monitoring stations and to process and manage the data for hydrometric purposes.

Application of the Unit

This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the tasks you need to be able to perform, to demonstrate that you can achieve the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and assess survey requirements.	<ul style="list-style-type: none">1.1 Planned survey exercises directly relate to the desired outcome and required <i>standard processes and software</i>.1.2 Identify the location and value of survey reference marks from maps and plans.1.3 Choose and justify appropriate survey techniques for specific <i>hydraulic conditions</i> and hydrographic purposes.1.4 Identify and evaluate the source of levelling errors and misclosures.1.5 Plan and manage the logistics and personnel to ensure effective outcomes and resource management.1.6 Apply correct care procedure for storage, transport and use of survey equipment.1.7 Assess and address occupational health and safety issues that may be encountered during the surveying exercise taking appropriate risk management strategies.1.8 Apply for and confirm appropriate authorisations for entry to property for the purpose of carrying out survey exercise.
2 Operate survey equipment.	<ul style="list-style-type: none">2.1 Set up survey equipment and use <i>mathematical techniques</i> to check for correct operation and prepared for use.2.2 Carry out collimation test to check the level for accuracy.2.3 Select survey equipment for suitability and use correctly and safely according to operating procedures.
3 Select and survey monitoring sites.	<ul style="list-style-type: none">3.1 Identify required survey reference marks (bench marks).3.2 Establish cease-to-flow level of controlling feature.3.3 Identify and assess high-flow cross section and sectional control by survey.3.4 Survey multiple cross sections of channels to determine the profile of the channel in the gauging station reach.3.5 Identify and assess groundwater monitoring site survey reference points
4 Document survey and data results.	<ul style="list-style-type: none">4.1 Correctly and accurately document and store results and verify in corporate database according to organisation and industry standards.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills:

- plan and map reading skills sufficient to locate features, find survey reference marks and plot locations
- level preparation, set-up and operation
- circular level check
- use procedure for elimination of parallax
- use procedure for conducting Collimation test
- audit the condition of staves, bubble level, measuring tapes
- prepare and load survey equipment for transportation
- identify common types of measuring tapes used in survey
- care and maintenance of measuring tapes
- preparation and holding of staves
- use a compass to determine a bearing position
- operation of a change point
- data capture and file management
- horizontal distance measurement by stadia
- physically identify an appropriate survey reference mark
- apply sightings and standard error checks

Required knowledge:

- mathematical and other scientific techniques relevant to the analysis of hydrometric data
- interaction of physico/chemico parameters of the process being monitored and the impact on data being recorded
- sensor/system characteristics and signal processing/algorithms, specifically with chemical sensors
- computer software relevant to the analysis and archiving of hydrographic data
- water sampling and testing procedures
- occupational health and safety procedures
- policies and standard operating procedures
- procedures for use of remote contact communication systems

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The candidate should demonstrate the ability to use appropriate survey equipment to collect survey data at monitoring stations and to process and manage the data for hydrometric purposes including:

- gathering and interpreting complex documentation and applying to the development and maintenance of rating curves
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and providing solutions to a range of flow conditions

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Standard processes and software may include:

- standards relevant to the monitoring network including:
 - AS 3778 for water measurement installations
 - WMO/Bureau of Meteorology guidelines for siting of meteorological sensors and systems
 - best practice methodology where standards are not available or applicable
- software for logical control device programming (maybe system specific or generic software) to automate control, sampling and alarming processes
- water data base management software for triggering alarms, notifications, advice to relevant authorities and management for actions
- procedures for:
 - data logging (programming interrogation, data downloading, data security)
- procedures for:
 - data processing
 - storage and presentation
 - conversion of raw logger file data to channel data in date/time/value format
 - deletion/inclusion/correction
 - quality codes/comments
 - check
 - archive
 - storing ancillary data
 - pluviographs
 - hyetographs
 - hydrographs
 - rating curves
 - tables
- procedures for the measurement of surface slopes and flood slopes
- procedures for the development, maintenance and extension of rating curves

- computation of flow from stage data and rating curves
 - software:
 - Kisters - Hydstra
 - Scientific Software Group - AquaChem
 - Microsoft - Excel
 - web-based development tools for presentation and reporting of data
- Hydraulic conditions*** may include:
- rapidly rising and falling stages
 - tail water and backwater affected
 - tidal effects
 - transitional from calibrated to channel
- Mathematical techniques*** may include:
- logarithmic transformation
 - conversion of units
 - graphical analysis
 - gauging calculations
 - calculation of sediment load, sediment yield and sediment deposition

Unit Sector(s)

Not applicable.

Competency field

Hydrography